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ANTICIPATIONS: AN EXPERIMENT IN PROPHECY.—IV.

BY H. G. WELLS.

VI. WAR.

IN shaping anticipations of the future of war there arises a certain difficulty about the point of departure. One may either begin upon such broad issues as the preceding forecasts have opened, or one may set all that matter aside for a space, and, having regard chiefly to the continually more potent appliances physical science offers the soldier, may try to develop a general impression of theoretically thorough war. The latter course will be taken here.

The great change that is working itself out in warfare is the same change that is working itself out in the substance of the social fabric. In warfare this takes the form of the progressive supersession of the horse and the private soldier, and the obliteration of the old distinction between the *leaders*, who pranced in a conspicuously dangerous and encouraging way into the picturesque incidents of battle, and the *led*, who cheered and charged and filled the ditches and were slaughtered in a wholesale, dramatic manner.

The revolution that is in progress from the old war to a new war different in its entire nature from the old is marked, primarily, by the steady progress in range and efficiency of the rifle and of the field gun—more particularly of the rifle. The rifle develops persistently from a clumsy implement that any clown may learn to use in half a day toward a very intricate mechanism, easily put out of order and easily misused, but of the most extraordinary possibilities in the hands of men of courage, character and high intelligence. One can conceive it as provided in

the future with cross-thread, telescopic sights, the focussing of which, corrected by some ingenious use of hygroscopic material, might even find the range and so enable it to be used with assurance up to a mile or more. It will probably also take on some of the characters of the machine gun. It will be used either for single shots or to quiver and send a spray of almost simultaneous bullets out of a magazine evenly and certainly over any small area the rifleman thinks advisable.

It will probably be portable by one man, but there is no reason, with the possible exception of the bayonet tradition the demands of which may be met in other ways, why it should be the instrument of one sole man. It will just as probably be slung with its ammunition and equipment upon bicycle wheels, and be the common care of two or more associated soldiers. Equipped with such a weapon, even a single couple of marksmen, by reason of smokeless powder and carefully chosen cover, might make themselves practically invisible and capable of surprising, stopping and destroying a visible enemy in quite considerable numbers who blundered within a mile of them. And a series of such groups of marksmen, so arranged as to cover the arrival of reliefs, provisions and fresh ammunition from the rear, might hold positions of a vast extent, and a few thousands might hold a frontier.

The only really effective and final defeat such an attenuated force of marksmen could sustain would be from the slow and circumspect advance upon it of a similar force of superior marksmen creeping forward under cover of night or of smokesHELLS and fire, digging pits during the snatches of cessation obtained in this way, and so coming nearer and nearer and getting a completer and completer mastery of the ground, until the approach of reliefs, food and fresh ammunition ceased to be possible. Thereupon, there would be nothing for it but surrender or a bolt in the night to positions in the rear—a bolt that might be hotly followed if it was deferred too late.

Probably, between contiguous nations that have mastered the art of war, instead of the pouring clouds of cavalry of the old dispensation, this will be the opening phase of the struggle, a vast duel all along the frontier between groups of skilled marksmen, continually being relieved and refreshed from the rear. Probably for a time there will be no definite army here or there, no controllable battle, no Great General in the field at all. But,

somewhere far in the rear, the central organizer will sit at the telephonic centre of his vast front, and he will strengthen here and feed there and watch—watch perpetually—the pressure, the incessant, remorseless pressure that is seeking to wear down his countervailing thrust. Behind the thin firing line that is actually engaged, the country for many miles will be rapidly cleared and devoted to the business of war. Big machines will be at work making the second, third and fourth lines of trenches that may be needed if presently the firing line is forced back, spreading out transverse paths for the swift, lateral movement of the cyclists who will be in perpetual alertness to relieve sudden local pressures. And all along those great motor roads our first Anticipations sketched, there will be a vast and rapid shifting to and fro of big, long range guns. These guns will probably be fought with the help of balloons, which will hang above the firing line all along the front, incessantly ascending and withdrawing.

It will be evident that such a warfare as this inevitable precision of gun and rifle forces upon humanity will become less and less dramatic as a whole, more and more as a whole a monstrous thrust and pressure of people against people. No dramatic little general, spouting his troops into the proper hysterics for charging, no prancing, merely brave officers, no reckless gallantry or invincible stubbornness of men will suffice.

The battalion commander will be replaced, in effect, by the organizer of the balloons and guns by which his few hundreds of splendid individuals will be guided and reinforced. In the place of hundreds and thousands of more or less drunken and untrained young men marching into battle, muddle headed, sentimental, dangerous and futile hobbledehoys, there will be thousands of sober men, braced up to their highest possibilities, intensely doing their best. For eight miles on either side of the firing lines—whose fire will probably never altogether die away while the war lasts—men will live and eat and sleep under the imminence of unanticipated death. Such will be the opening phase of the war that is speedily to come.

And behind the thin firing line on either side, a vast multitude of people will be at work. Indeed, the whole mass of the efficient in the state will have to be at work, and most of them will be simply at the same work or similar work to that done in peace time—only now as combatants upon the lines of communi-

cation. The organized staffs of the road managements, now become a part of the military scheme, will be deporting women and children and feeble people, and bringing up supplies and supports. The doctors will be dropping from their civil duties into pre-appointed official places, directing the feeding and treatment of the shifting masses of people, and guarding the valuable manhood of the fighting apparatus most sedulously from disease. The engineers will be entrenching and bringing up a vast variety of complicated and ingenious apparatus, designed to surprise and inconvenience the enemy in novel ways. The dealers in food and clothing, the manufacturers of all sorts of necessary stuff, will be converted by the mere declaration of war into public servants.

The spontaneous traffic of the roads in peace will fall now into two streams; one of women and children coming, quietly and comfortably, out of danger; the other of men and material going up to the front. There will be no panics, no hardships, because everything will have been amply prearranged—we are dealing with an ideal state. Quietly and tremendously that state will have gripped its adversary and tightened its muscles—that is all.

Now, the strategy of this new sort of war, in its opening phase, will consist mainly in very rapid movements of guns and men behind that thin screen of marksmen, in order to deal some forcible blow, suddenly and unexpectedly to snatch at some position into which guns and men may be thrust to outflank and turn the advantage of the ground against some portion of the enemy's line. The game will be largely to crowd and crumple that line, to stretch it over an arc to the breaking point, to secure a position from which to shell and destroy its supports and provisions, and to capture or destroy its guns and apparatus. A factor of primary importance in this warfare, because of the importance of seeing the board, a factor which will be enormously stimulated to develop in the future, will be the aerial factor. Already we have seen the captive balloon as an incidental accessory of considerable importance, even in the wild country warfare of South Africa. But in the warfare that will go on in the highly organized European states of the opening century, the special military balloon used in conjunction with guns, conceivably of small calibre, but of enormous length and range, will play a part of primary importance.

These guns will be carried on vast mechanical carriages, pos-

sibly with wheels of such a size as will enable them to traverse almost all sorts of ground. The aeronauts, provided with large scale maps of the hostile country, will mark down to the gunners below the precise point upon which to direct their fire; and over hill and dale the shell will fly—ten miles, it may be—to its billet, camp, massing night attack, or advancing gun. Great multitudes of balloons will be the Argus eyes of the entire military organism, stalked eyes with a telephonic nerve in each stalk, and at night they will sweep the country with search-lights, and come soaring before the wind with hanging flares. Probably, they will be steerable. And, so far as the resources of the men on the ground go, the balloons will be invulnerable. The mere perforation of balloons which shot does them little harm; and the possibility of hitting a balloon that is drifting about at a practically unascertainable distance and height so precisely as to blow it to pieces with a timed shell, within the little time before it is able to give simple and precise instructions as to your range and position to the unseen gunners it directs, is certainly one of the most difficult and trying undertakings for an artillery-man that one can well imagine. I am inclined to think that these considerations against a successful attack on balloons from the ground will stimulate enterprise and invention enormously in the direction of dirigible aerial devices that can be fought. Few people, I fancy, who know the work of Langley, Lilienthal, Pilcher, Maxim and Chanute, but will be inclined to believe that long before the year 2000, A. D., probably before 1950, a successful aeroplane will have soared and come home safe and sound. Directly that is accomplished, the new invention will be most assuredly applied to war. This opening phase, therefore, of deadlocked lines of marksmen below will be accompanied by a desperate and finally decisive struggle for the command of the sky. They will lie warily in their shelter pits and see—. What will they see?

The nature of the things that will ultimately fight in the sky is a matter for curious speculation. We begin with the captive balloon. Against that the navigable balloon will presently operate. I am inclined to think the navigable balloon will be first attained by the use of a device already employed by nature in the swimming bladder of fishes. This is a closed gas bag, that can be contracted or expanded. If a gas bag of thin, strong, practically impervious substance could be enclosed in a net of closely inter-

laced fibres (interlaced, for example, on the pattern of the muscles of the bladder in mammals), the ends of these fibres might be wound and unwound, and the effect of contractibility attained. A row of such balloons hung over a long car, which was horizontally expanded into wings, would not only allow that car to rise and fall at will, but if the balloon at one end were contracted, that at the other end expanded and the intermediate ones allowed to assume intermediate conditions, the former end would drop, the expanded wings would be brought into a slanting condition over a smaller area of supporting air, and the whole apparatus would tend to glide downwards in that direction. The projection of a small vertical plane upon either side would make the gliding mass rotate in a descending spiral—and so we have all the elements of a controllable flight. Such an affair would be difficult to overset. It would be able to beat up even in a fair wind, and then it would be able to contract its bladders and fall down a long slant in any direction. From some such crude beginning a form like a soaring, elongated, flat-brimmed hat might grow, and the possibilities of adding an engine-driven screwtail are obvious enough.

Between flying machine and flying machine it will be a fight of hawks complicated by bullets and little shells. They will rush up and up to get the pitch of one another, until the aeronauts sob and sicken in the rarified air, and the blood comes to eyes and nails. The marksmen below will strain at last, eyes under hands, to see the circling battle that dwindles in the zenith. Then, perhaps, a wild adventurous dropping of one close beneath the other, an attempt to stoop, the sudden splutter of guns, a tilting up or down, a disengagement. What will have happened? One combatant, perhaps, will heel lamely earthward, dropping, dropping, with half its bladders burst or shot away, while the other circles down in pursuit. "What are they doing?" Our marksmen will snatch at their field-glasses, tremulously anxious. "Is that a white flag, or no?"—

Once the command of the air is obtained by one of the contending armies, the war must become a conflict between a seeing host and one that is blind. The victor in that aerial struggle will tower with pitilessly watchful eyes over his adversary, will concentrate his guns and all his strength unobserved, will mark all his adversary's roads and communications and sweep them with

sudden, incredible disasters of shot and shell. The moral effect of this predominance will be enormous. All over the losing country, not simply at his frontier, but everywhere, the victor will soar. Everybody everywhere will be perpetually and constantly looking up, with a sense of loss and insecurity, with a vague distress of painful anticipations. By day, the victor's aeroplanes will sweep down upon apparatus of all sorts in the adversaries' rear and will drop explosive and incendiary matters upon them, so that no apparatus or camp or shelter will any longer be safe. At night, his high floating search-lights will go to and fro, and discover and check every desperate attempt to relieve or feed the exhausted marksmen of the fighting line. The phase of tension will pass—the weakening opposition will give, and the war, from a state of mutual pressure and petty combat, will develop into the collapse of the defensive lines. A general advance will occur under the aerial van. With that advance the phase of indecisive contests will have ended and the second phase of the new war, the business of forcing submission, will begin. This should be more easy in the future even, than in the past, in spite of the fact that central governments are now more elusive and small bodies of rifle-armed guerillas far more formidable than ever before. It will probably be brought about in a civilized country by the seizure of the vital apparatus of the urban regions, the water supply, the generating stations for electricity (which will supply all the heat and warmth of the land), and the chief ways used in food distribution. Through these expedients, even while the formal war is still in progress, an irresistible pressure upon a local population will be possible; and it will be easy to subjugate or to create afresh local authorities who will secure the invader from any danger of a guerilla warfare upon his rear. Through that a very obdurate loser will be got down to submission area by area. With the destruction of its military apparatus and the prospective loss of its water and food supply, however, the defeated civilized state will probably be willing to seek terms, as a whole, and bring the war to a formal close.

In cases where instead of contiguous frontiers the combatants are separated by the sea, the aerial struggle will probably be preceded or accompanied by a struggle for the command of the sea. Of this warfare there have been many forecasts. In this, as in

all the warfare of the coming time, imaginative foresight, a perpetual alteration of tactics, a perpetual production of unanticipated devices, will count enormously. Other things being equal, victory will rest with the force mentally most active. What type of ship may chance to be prevalent when the great naval war comes is hard guessing; but I incline to think that the naval architects of the ablest peoples will concentrate more and more upon speed and upon range and penetration and above all upon precision of fire. I seem to see a light type of ironclad, armored thickly only over its engines and magazines, murderously equipped and with a ram, as alert and deadly as a striking snake. In the battles of the open she will have little to fear from the slow, fumbling treacheries of the submarine. She will take as little heed of the chance of a torpedo as a barefooted man does of a needle in his path. Unless I know nothing of my own blood, the English and Americans will prefer to catch their enemies in ugly weather, or at night, and then they will fight to ram. The struggle on the high seas between any two naval powers (except, perhaps, the English and Americans, who have both unparalleled opportunities for coaling), will not last more than a week or so. One force or the other will be destroyed at sea, driven into its ports and blockaded there, or cut off from its supply of coal (or other force generator), and hunted down to fight or surrender. An inferior fleet that tries to keep elusively at sea, will always find a superior fleet between itself and coal, and will either have to fight at once or be shot into surrender as it lies helpless on the water. Some commerce-destroying enterprise on the part of the loser may go on, but I think the possibilities of that sort of thing are greatly exaggerated. The world grows smaller and smaller, the telegraph and telephone go everywhere, wireless telegraphy opens wider and wider possibilities to the imagination, and how the commerce-destroyer is to go on for long without being marked down, headed off, cut off from coal and forced to fight or surrender, I do not see. The commerce-destroyer will have a very short run. It will have to be an exceptionally good and costly ship, in the first place. It will be finally sunk or captured; and altogether I do not see how that sort of thing will pay when once the command of the sea is assured. A few weeks will carry the effective frontier of the stronger power up to the coast line of the weaker, and permit of the secure resumption of the overseas trade

of the former. Then will open a second phase of naval warfare, in which the submarine may play a larger part.

I must confess that my imagination, in spite of spurring, refuses to see any sort of submarine doing anything but suffocate its crew and founder at sea. It must involve physical inconvenience of the most demoralizing sort simply to be in one for any length of time. Imagine yourself in one, that has ventured a few miles out of port. Imagine that you have headache and nausea, and that some such ship as the *Viper* is flashing itself and its search-lights about whenever you come up to the surface, and promptly tearing down on your descending bubbles with a ram, perhaps trailing a tail of grapples or a net as well. You may, of course, throw out a torpedo or so—with as much chance of hitting vitally as you would have if you were blindfolded, turned round three times and told to fire revolver shots at a charging elephant. The possibility of sweeping for a submarine with a seine would be vividly present in the minds of a submarine crew. If you are near shore, you will probably be near rocks—an unpleasant complication in a hurried dive. Probably there would very soon be boats out, too, seeking with a machine gun or a pom-pom for a chance at your occasionally emergent conning tower. In no way can a submarine be more than purblind; it will be, in fact, practically blind. It will shut its eyes to charge; it will always be shutting its eyes. Given a derelict ironclad on a still night, within sight of land, a carefully handled submarine might succeed in groping its way to it and destroying it; but then it would be much better to attack such a vessel and capture it boldly with a few desperate men on a tug. At the utmost, the submarine will be used in narrow waters, in rivers, or to fluster or destroy ships in harbor. That is to say, it will simply be an added power in the hands of the nation that is predominant at sea. And even then it can be merely destructive, while a sane and high-spirited fighter will always be dissatisfied if, with an indisputable superiority of force, he fails to take.

The military advantages of the command of the sea will probably be greater in the future than they have been in the past. A fleet with aerial supports would be able to descend upon any portion of the adversary's coast it chose, and to dominate the country inland for several miles with its gun fire. All the enemy's sea-coast towns would be at its mercy. It would be able to effect

landings and send raids of cyclist marksmen inward, whenever a weak point was discovered. Landings will be enormously easier than they have ever been before. Once a wedge of marksmen has been driven inland they would have all the military advantages of the defense, when it came to eject them. They might, for example, encircle and block some fortified post and force costly and disastrous attempts to relieve it. The defensive country would stand at bay, tethered against any effective counter blow, keeping guns, supplies and men in perpetual and distressing movement to and fro along its sea frontiers. Its soldiers would get uncertain rest, irregular feeding, unhealthy conditions of all sorts in hastily made camps. The attacking fleet would divide and reunite, break up and vanish, amazingly reappear. The longer the defender's coast, the more wretched his lot. Never before in the world's history was the command of the sea worth what it is now. But the command of the sea is, after all, like military predominance on land, to be insured only by superiority of equipment in the hands of a certain type of man, a type of man that it becomes more and more impossible to improvise.

All this elaboration of warfare lengthens the scale between theoretical efficiency and absolute unpreparedness. In practice the fight will never be between equal sides, but between the more efficient and the less efficient, between the more inventive and the more traditional. While the victors, disciplined and grimly intent, full of the sombre, yet glorious delight of a grave thing well done, will be fighting like one great national body without shouting or confusion, the losers will be taking that pitiless exposure of helplessness in such a manner as their national culture and character may determine. War for the losing side will be an unspeakably pitiable business. There will be, first of all, the coming of the war, the wave of excitement, the belligerent shouting of the unemployed inefficients, the flag waving, the secret doubts, the eagerness for hopeful news, the impatience of the warning voice. I seem to see, almost as if he were symbolic, the gray old general, the general who learned his art of war away in the vanished nineteenth century, the gray old general with his epaulettes and decorations, his uniform that has still its historical value, his spurs and his sword, riding along on his obsolete horse, by the side of his doomed column. Above all things he is a gentleman. And the column looks at him lovingly with

its countless boys' faces; and the boys' eyes are infinitely trustful, for he has won battles in the old time. They will believe in him to the end. They have been brought up in their schools to believe in him and his class, their mothers have mingled respect for the gentlefolk with the simple doctrines of their faith; their first lesson on entering the army was the salute. So the gray general rides, and his doomed columns march by in this vision that haunts my mind.

I cannot foresee what such a force will attempt to do against modern weapons. Nothing can happen but the needless and most wasteful and pitiful killing of these poor lads who make up the infantry battalions, the main mass of all the European armies of to-day, whenever they come against a sanely organized army. Yet, in the ampler prospect, even this haunting tragedy of innumerable, avoidable deaths is but an incidental thing. The ampler fact, after all, is the inexorable tendency in all this to make a soldier a skilled and educated man and to link him in sympathy and organization with the engineer and the doctor and all the continually developing mass of scientifically educated men—that new social organism which the advance of mechanism is producing. The warfare of the coming time will really be won in schools and colleges and universities wherever men write and read and talk together. The nation that produces, in the near future, the largest proportional development of educated and intelligent engineers, agriculturists, doctors, schoolmasters, professional soldiers, and intellectually active people of all sorts; the nation that most resolutely picks over, educates, sterilizes, exports or poisons its People of the Abyss; the nation that succeeds most subtly in checking gambling and the moral decay of women and homes that gambling inevitably entails; the nation that, by wise interventions, death duties and the like, contrives to expropriate and extinguish incompetent families, while leaving individual ambitions free; the nation, in a word, that turns the greatest proportion of its irresponsible adiposity into social muscle will certainly be the nation that will be the most powerful in warfare, will certainly be the ascendant or dominant nation before the year 2000. In the long run, no heroism and no accidents can alter that. No flag waving, no Patriotic Leagues, no visiting of essentially petty Imperial Personages hither and thither, no smashing of windows of outspoken people,

nor seizures of papers and books, will arrest the march of national defeat. And this issue is already so plain and simple, the alternatives are becoming so pitilessly clear, that even in the stupidest court and the stupidest constituencies it must presently begin in some dim way to be felt. A time will come when so many people will see this issue clearly that it will affect gravely both political and social life. The patriotic party will be forced to become an efficiency party, in profession at least, to stimulate and organize the educational and social development that may at last bring even patriotism under control. The rulers of the gray, the democratic politician and the democratic monarch, will be forced year by year by the very nature of things to promote the segregations of colors within the gray, to foster the power that will finally supersede democracy altogether, the power of the scientifically educated, disciplined specialist, the power of the thing that is provably right.

I propose at last, in these Anticipations, to give some reasons for looking towards one particular nation which will, I believe, upon the assumptions here made first get itself organized and equipped upon the new lines and emerge to predominance throughout the world during the next century—so great is my prophetic temerity! But before that is done a certain body of considerations affecting language and the sentiment of nationality and, indeed, the very meaning of “nation” will have to be dealt with. These considerations will constitute the matter of the paper immediately following this.

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(To be continued.)